

Abstract Submitted
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Results of tantalum Rayleigh-Taylor strength experiments at high pressure and high strain rates on NIF and Omega¹ H. -S. PARK, N. R. BARTON, R. M. CAVALLO, C. M. HUNTINGTON, J. M. MCNANEY, B. A. REMINGTON, R. E. RUDD, P. D. POWELL, S. PRISBREY, D. C. SWIFT, C. E. WEHREBERG, A. ARSENLIS, Lawrence Livermore National Laboratory — Understanding the high pressure, high strain rate plastic deformation dynamics of materials is an area of research of high interest to a number of fields, including meteor impact dynamics and advanced inertial confinement fusion designs. Developing predictive theoretical and computational descriptions of such systems, however, has been a difficult undertaking. We have performed many strength experiments on Omega [1] and NIF to test Ta strength models at high pressures (up to 8 Mbar), high strain rates ($\sim 10^7$ s⁻¹) and high strains (>30%) under ramped compression condition using Rayleigh-Taylor instability properties. Our studies show that the work hardening dominates in this regime. We will describe the experimental results of the high pressure plastic deformation dynamics of tantalum from Omega and NIF in comparison with the various strength models including Livermore Multiscale Model [2]. [1] H. -S. Park et al., Phys. Rev. Lett. 114, 065502 (2015). [2] N. Barton, et al., J. App. Physics, 109, 073501 (2011).

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Hye-Sook Park
Lawrence Livermore National Laboratory

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